AMRT
A joint venture parnership between Motorola Inc. and Schlumberger Inds. Inc.

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Ph : (404) 417-2949 fax : (404) 417-2961

August 18, 1995

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington D.C. 20554

In the Matter of	)	
	)	
Replacement of Part 90 by Part 88 to	)	
Revise the Private Land Mobile Radio	)	
Services and Modify the Policies	)	
Governing Them	)	
	)	
and	)	**PR DOCKET NO. 92-235**
	)	
Examination of Exclusivity and	)	
Frequency Assignment Policies of	)	
the Private Land Mobile Radio Services	)	

PETITION FOR RECONSIDERATION AND CLARIFICATION

Advanced Meter Reading Technologies (AMRT) hereby files this Petition for Reconsideration and Clarification of the Commission's decision in the above captioned proceeding. AMRT, a manufacturer of low power remote meter reading technologies, is most concerned about the continued availability of adequate spectrum for low power private land mobile operations.

BACKGROUND: AMRT, a joint venture between Schlumberger Industries, Inc., and Motorola, Inc., has developed automatic remote meter reading technology for use in the private land mobile UHF frequency bands. As the Commission is fully aware, automatic meter reading provides energy utilities with real time information on its load distribution thus enabling the adjustment and regulation of energy flow to better reduce costs and improve operational efficiencies. Radio based meter reading networks provide for a low cost, reliable infrastructure that significantly increase the functionality of such systems.

AMRT is developing a variety of meter reading solutions for utilities. These solutions include the installation of radio frequency Meter Interface Units (MIUs) that have both transmit and receive capabilities, and MIU devices that simply transmit their usage information automatically and

intermittently. The more sophistication designed into the MIU device, the more capability utilities will have to monitor and control energy usage to individual consumers. While most designs call for fixed, point-to-multipoint configurations, AMRT is also developing systems that allow walk-by or drive-by measurement readings. It is essential that customers be able to migrate to these additional functions as their needs and economics warrant.

AMRT's bi-directional designs call for MIU transmitter powers of approximately 100 milliwatts. Our Concentrator Interface Unit (CIU), which serves to redistribute the transmissions of multiple MIUs back to a central data collection point operates with a transmitter ERP of 400 milliwatts. As such, these applications are well suited to operate on channels in the 450-470 MHz band that are allocated for stations operating at 2 watts or less. To the extent, that the FCC's Report and Order reconfigures the available low power channels to high power use, low power users could be negatively impacted.

AMRT notes and appreciates the FCC's most recent action to "freeze" the acceptance of applications for high power use of the 450 MHz 12.5 kHz offsets until the frequency coordinating committees complete their task of proposing a plan to consolidate the various radio services and identify 450 MHz offset channels for continued low power use. This action was timely and necessary and allows the industry to proceed with its transition in a cautious and thoughtful manner. In this petition, however, AMRT offers recommendations for minor modifications of the FCC's new rules to further facilitate and promote efficient low power operations.

PETITION FOR RECONSIDERATION: As noted, the continued availability of low power channels in the 450 MHz band remains a primary concern of AMRT. Given the Commission's continued encouragement to the frequency coordinators to identify low power channels on a service category specific basis, we remain confident that our and millions of users' interests will be served. Indeed, AMRT intends to work closely with the coordinators to ensure that adequate low power spectrum is identified.

One additional benefit that the FCC can provide to manufacturers of low power devices concerns the applicability of Section 90.217 which exempts transmitters operating with less than 120 milliwatts from having to comply with most technical standards imposed on type accepted equipment.[1] As currently written, this section applies only to operations licensed under the Business Radio Service. AMRT requests that the applicability of this section be expanded to include all transmitters operating under 120 milliwatts regardless of the radio service. Such an action would provide manufacturers with additional design flexibility without increasing potential interference. This action would also be more fair since there is no real need in this instance to distinguish transmitters by radio service.

Indeed, the Commission has already determined that consolidation of the various radio services will occur. One possible scenario would have other existing industrial radio services merge with the Business Radio Service. In this fashion, additional radio services would fall under the scope of the rule on a somewhat arbitrary basis. The better result would be to expand the scope to include all transmitters operating with less than 120 milliwatts.

Another possible consolidation scenario would be the merging of the Business Radio Service with other radio services to form an entirely new radio service. In this case, the applicability of Section 90.217 to any radio service would be unclear. Lacking any information that would justify the limited nature of the rule, the best course for the Commission would be to clarify that the applicability of this rule section covers all private land mobile transmitters operating under 120 milliwatts.

The second matter of concern for AMRT relates to the new standard for spectrum efficiency adopted by the Commission.[2] The purpose of this new policy is to allow the development of alternative technologies provided that they offer similar efficiencies to the FCC benchmark technologies. As of August 1996, the equivalent spectrum efficiency standard provides that alternative technologies must have at least one talk path per 12.5 kHz and/or operate at data rates exceeding 4800 bits per second per 6.25 kHz. In January of 2005, the standards are increased to one talk path per 6.25 kHz and/or a data rate of 4800 bits per second per 6.25 kHz.

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1 47 C.F.R. Section 90.217 .

2 47 C.F.R. Section 90.203(j)(3) and (5).

AMRT believes that the Commission's new rules do not adequately recognize the spectrum efficiencies inherent in low power devices. When used as part of a frequency reuse scheme over a particular geographic area, low power transmitters offer more spectrum efficiency[3] than a single high powered data transmitter. In other words, multiple 100 milliwatt transmitters operating at 2400 bits per second will be able to serve many more homes than a single high powered transmitter operating at 9600 bits per second. And, the low power operations will far less impact on adjacent channel operations. For these reasons, AMRT requests that Section 90.203 be clarified to allow alternative showings of equivalent spectrum efficiencies such as low power frequency reuse systems.

CONCLUSION: The operation of low power transmitting devices such as AMRT's meter reading technology provides tremendous benefits to the American business community. The FCC has recognized these benefits and has encouraged the frequency coordinators to make special provisions for the continued existence of a low power service. By adopting the recommendation contained herein, the FCC will be taking greater strides to promote this industry without any negative effects to other users or spectrum efficiency. For these reasons, AMRT urges the FCC to expand the scope of Section 90.217 to cover all private land mobile radio services and to modify its standards for spectrum efficiency to recognize the benefits of low power, frequency reuse systems.

Respectfully Submitted,

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Appendix

[3] The appendix provides greater discussion on the equivalent efficiencies offered by low power devices.

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APPENDIX

Table 2 in section 90.205 predicts 3 Km service area for 2W ERP system with a HAAT of 15 meters. This is consistent with Hata Okumura propagation prediction equations. We can derive effective service areas for lower ERP and antenna height systems and then compute the potential frequency reuse for these systems. The potential reuse factor will be a function of the ratio of the area of the 3 Km radius cell to the radius of the smaller cell, it will thus be proportional to the square of the two cell radii ratio.

The definition for equivalent spectrum efficiency used in section 90.203 is 4800 bps in a 6.25 Khz channel, which leads to 19200 bps in 25Khz.

In the fixed infrastructure AMR system developed by AMRT, cells will be 1 km radius. The power will be 100 mW and the antenna height will be approximately 6.67 meters.

Since HAAT has the effect of multiplying the ERP by a factor of 6dB for each doubling of height above 2 meters (Hata / Okumura) we can compute the cell radius for both 15 meter and 6.67 meter antennas. We can calculate the reuse based in relative areas, and then the minimum acceptable data rate based on a modified definition of spectrum efficiency.

AMRT proposes that a modified definition of spectrum efficiency for low power systems be derived as :

Minimum data rate - $R_d = 4800 * B_w / F_r * 15 / H_a$

Where : R_d = minimum permissible data rate
B_w = channel bandwidth
F_r = frequency reuse
= A_3/A_r
= 3Km radius cell area/r Km radius cell area
H_a = Antenna height

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The proposed tables of data rate versus antenna height and ERP are shown below:

Table # 1 : for minimum data rate for 15m antenna height			
Transmit power	Cell radius	Frequency Reuse	Data rate/25 KHz
W	Km	times	bps
2	3	1.00	19200
1	2.35	1.63	11781
0.5	1.92	2.44	7864
0.25	1.54	3.79	5059
0.1	1.14	6.93	2772

Table # 2 : for minimum data rate for 6 meter antenna height			
Transmit power	Cell radius	Frequency reuse	Data rate/25 KHz
W	Km	times	bps
2	2.2	1.86	10325
1	1.72	3.03	6336
0.5	1.41	4.54	4229
0.25	1.13	7.06	2721
0.1	0.84	12.88	1491

The data rate shown in table 2 column 4, would be the minimum data rate for a low power device used in a frequency reuse scheme to acheive equivalent channel efficiency with that required in section 90.203

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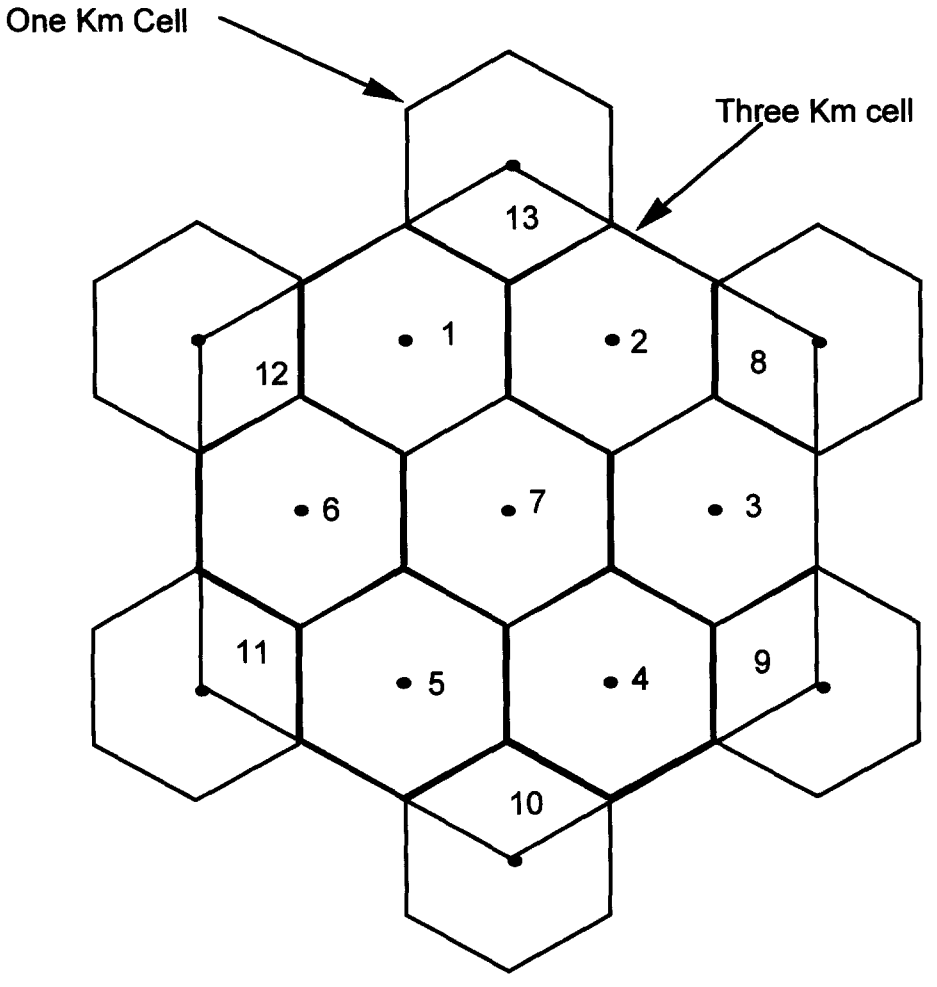
Diagram of a comparison of one 3 KM cell and a 1 Km cell overlay



This diagram represents the coverage of a 3 Km radius cell to a 1 Km radius cell

There is the equivalent of 8 one Km cells in a single 3 Km cell, which permits the possibility of 8 simultaneous links